UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

October 11, 2002

Megan Hall
Federal Highway Administration
711 Capitol Way S. Suite 501
MS 40943
Olympia, Washington 98501-1284

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Beaver-Frazer Creeks Fish Passage Culvert Repair, Okanogan County, Washington (NOAA Fisheries No. WHB-02-105)

Dear Ms. Hall:

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. 1531, et seq. and the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996, the attached document transmits the National Marine Fisheries Service's (National Oceanic and Fisheries Administration)[NOAA Fisheries] Biological Opinion (Opinion) and MSA consultation on construction activities necessary for replacement of culverts and minor channel modifications in Beaver and Frazer Creeks. Construction elements of the subject line project will occur in the Methow River subbasin, Beaver Creek watershed, Okanogan County, Washington. The Federal Highway Administration (FHWA), determined that the proposed action was likely to adversely affect the Upper Columbia River steelhead (Oncorhynchus mykiss) and spring chinook (O. tshawytscha) Evolutionarily Significant Unit (ESU), and requested formal consultation. NOAA Fisheries concurred with this determination, and initiated formal consultation.

This Opinion reflects the results of a formal ESA consultation and contains an analysis of effects covering the Upper Columbia River steelhead and spring chinook in the Methow River and Beaver Creek , Washington. The Opinion is based on information provided in the Biological Assessment (BA), its subsequent addenda, and additional information transmitted via telephone conversations and e-mail. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

NOAA Fisheries concludes that implementation of the proposed project is not likely to jeopardize the continued existence of Middle Columbia River steelhead or spring chinook or result in destruction or adverse modification of their habitat. In your review, please note that the incidental take statement, which includes Reasonable and Prudent Measures and Terms and Conditions, was designed to minimize take.

The MSA consultation concluded that the proposed project may adversely impact designated Essential Fish Habitat (EFH) for chinook (O. tshawytscha) and coho (O. kisutch) salmon. The Reasonable and Prudent Measures of the ESA consultation, and Terms and Conditions identified therein, would address the negative effects resulting from the proposed FHWA actions. Therefore, NOAA Fisheries recommends that they be adopted as EFH conservation measures.

If you have any questions, please contact Diane Driscoll of the Washington Habitat Branch, Ellensburg Field Office at (509) 962-8911.

Sincerely,

for Michael R Course

D. Robert Lohn
Regional Administrator

Enclosure

cc: Claton Belmont - WSDOT
Don Morehouse - WSDOT
Paul Wagner - WSDOT

Endangered Species Act - Section 7 Consultation

Biological Opinion

And

Magnuson-Stevens Fishery Conservation and Management Act

Essential Fish Habitat Consultation

Beaver Creek - Frazer Creek Fish Passage Culvert Repair
Okanogan County, Washington
WHB-02-105

Agency: Federal Highway Administration

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Issued by: For Michael R Crouse Date: October 11, 2002

D. Robert Lohn
Regional Administrator

TABLE OF CONTENTS

1.0 INTRODUCTION

This document transmits the National Marine Fisheries Service (National Oceanic and Atmospheric Administration [NOAA] Fisheries) biological opinion (Opinion) and Essential Fish Habitat (EFH) consultation based on our review of a project to replace two fish passage barriers with three-sided reinforced concrete structures with natural streambed bottoms. The proposal includes the realignment of approximately 140 feet of Beaver Creek. Frazer Creek is a tributary to Beaver Creek which flows into the Methow River. The proposed projects are located in the Upper Columbia River (UCR) evolutionary significant unit (ESU) for endangered steelhead (*Oncorhynchus mykiss*) and spring chinook (*O. tshawytscha*). Beaver and Frazer Creeks are also essential fish habitat for chinook (*O. tshawytscha*) and coho (*O. kitsutch*).

1.1 Background and Consultation History

On March 1, 2002, NOAA Fisheries received a Biological Assessment (BA) and a request for Endangered Species Act (ESA) section 7 informal consultation and EFH consultation from the Washington State Department of Transportation (WSDOT) for the SR20, Beaver/Frazer Creek Fish Passage Culvert Repair projects. The proposed action includes removing the existing culverts and replacing them with precast reinforced concrete three-sided culverts. The Beaver Creek project also includes the realignment of approximately 140 feet of channel and installation of three rock weirs on the downstream side of the culvert. The specific location and proposed work window reduces the likelihood of UCR spring chinook impacts to near zero. However, adult UCR steelhead and resident rainbow trout have been observed in Beaver Creek and could be affected by the projects. Therefore NOAA Fisheries did not concur with the WSDOT determination of "may affect, not likely to adversely affect" for UCR steelhead and formal consultation was recommended to the WSDOT and the Federal Highways Administration (FHWA).

The NOAA Fisheries reviewed the following information and engaged in the following steps to reach its determination and prepare this Opinion and EFH consultation:

- April 15, 2002 meeting with WSDOT and Washington Department of Fish and Wildlife (WDFW) representatives in Wenatchee, Washington.

- May 16, 2002, letter of nonconcurrence sent to FHWA.

- June 18, 2002 request for EFH and section7 formal consultation received from FHWA and consultation initiated.

Several phone calls and electronic correspondence have also become part of the consultation file.

The objective of this document is to decide whether the proposed project is likely to jeopardize the continued existence of UCR steelhead, UCR spring chinook or result in the destruction or adverse modification of their habitat. They describe the standards for determining jeopardy in

section 7(a)(2) of the ESA and further defined in 50 C.F.R. 402.14. This document also presents NOAA Fisheries' consultation on activities that may adversely affect EFH under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

1.2 Description of the Proposed Action

FHWA has proposed to provide funding to WSDOT which will enable the replacement of two fish passage barrier culverts in the Beaver Creek subwatershed, Okanogan County, Washington. The culverts are located where SR 20 crosses Beaver Creek and Frazer Creek, respectively.

1.2.1 Beaver Creek

Beaver Creek presently passes under SR20 through a six-foot by six-foot concrete box and two four-foot diameter reinforced concrete pipes (RCP). The box culvert carries the primary channel while the other culverts become active during high flows. These three culverts create a velocity barrier during high flows hindering passage of adult and juvenile fish. The existing culverts are also often blocked with debris during high flows creating a backwater that rises to the road level, affecting the fill slope and water quality. The existing stream channel makes a 90-degree turn immediately before flowing into the culvert and creates the potential for roadway failure and increased sedimentation.

The proposal for the Beaver Creek site is to replace the three existing culverts with a 26-foot span, precast reinforced concrete three-sided structure with a natural streambed bottom. The proposed project will entail excavating a total of 1,561 cubic yards of material for surfacing the roadway, channel realignment, and placement of the new culvert. The proposed structure will rise six feet above the streambed. The WSDOT will realign the existing stream channel to remove a 90-degree turn and the new culvert will be placed approximately 50 feet north of the existing structure. The project will realign approximately 100 feet of the downstream channel and 40 feet of the upstream channel. Three rock weirs will be placed on the downstream realignment to maintain a channel slope of 1.3% while allowing the new channel to rejoin the existing stream channel. They will install streambed retention sills inside the culvert five feet from the inlet and outlet. After the culvert replacement, the WSDOT will resurface approximately 600 feet of the existing roadway and transfer buried phone lines to an aerial installation. An additional 150 cubic yards of material will be added to the roadway embankment for guardrail widening. The project will result in approximately 0.07 acres of new impervious surface.

1.2.2 Frazer Creek

The proposed improvement at the Frazer Creek crossing is to replace the two existing 36-inch diameter RCPs with a 15-foot span, precast reinforced concrete 3-sided structure. Excavation will include a total of 1,101 cubic yards of material for surfacing, channel realignment and structure excavation. This structure will rise 3.3 feet above the streambed at the inlet and four feet above the streambed at the outlet. The project will realign 22 feet of upstream channel to

provide more room between the stream and the roadbed. The realignment will remove some present sharp turn constrictions and provide a more natural bend in the channel. Bank protection will be needed where the stream channel bends before entering and after exiting the culvert. Bioengineering techniques using 16 to 18 inch diameter log structures will be used at both the entrance and exit of the culvert for bank protection. Two rock weirs will be installed on the downstream realignment and one upstream of the culvert. They will install streambed retention sills inside the culvert five feet from the inlet and outlet. Approximately 600 feet of roadway will be resurfaced and buried phone lines will be moved to an aerial location. The project will result in approximately 0.07 acres of new impervious surface.

1.2.3 Diversion of stream and removal of fish

Beaver Creek
The stream will remain in its existing channel while the new culvert and the new channel alignment are constructed. After they have installed the culvert and prepared the new channel, fish will be removed from the channel to be abandoned according to the following methods:

1. To prevent additional fish from moving into the work area, block nets will be installed at up and downstream locations. Block net mesh size, length, type of material, and depth will vary based on site conditions. Generally, block net mesh size is the same as the seine material (9.5 mm stretched). During fish removal activities, the block nets will be left in place and checked at least once daily to make sure the nets are function properly. Monitoring for effectiveness and debris removal will be conducted as necessary to ensure proper function. A designated individual will monitor and maintain the nets. Block nets will be installed securely along both banks and in the channel to prevent failure.

2. Assisted by WDFW biologists, workers will use a seining net held perpendicular to the flow, and move downstream to direct any fish downstream and out of the area to be dewatered. They will conduct this procedure until WDFW biologists are satisfied that no fish are remaining in the area that seineing can remove. As they dewater the work area, qualified biologists will capture any fish observed in the area using dip nets and transport to free-flowing water. Capture and transport of stranded fish will begin immediately after the stream is blocked off and last until all fish are removed.

    a. After all visible fish have been removed from the segment to be dewatered, sandbags or other blocking devices will be placed incrementally in the channel to divert the streamflow from the old channel to the new channel. By gradually reducing the flow in the old channel, any fish hiding in the substrate will have a greater likelihood of being observed and removed by the biologist on site.

Frazer Creek
The same techniques for isolating the work area and fish removal described above for Beaver Creek shall be used here. After they have removed fish and isolated the work area, Frazer Creek will be diverted through a 24-inch bypass pipe prior to excavation for the new structure. Any pumps used to bypass the work site will be fitted with mesh screens to protect aquatic life. All water removed from the work area will be routed to an area outside the ordinary high water mark (OHWM) and allowed to re-infiltrate. The new structure, including streambed materials, will be completed prior to removing the temporary bypass pipe. Most of the excavation work will be done from the existing roadway. The only work anticipated to occur along the stream banks is that in the vicinity of the inlet and outlet of the temporary bypass pipe, and that necessary to connect the existing and new channel.

FHWA, WSDOT, WDFW and individuals authorized to work under this consultation will ensure that proper fish handling techniques are strictly adhered to. Any injury or killing of listed species will be reported to NOAA Fisheries within two working days. Verbal notification followed by monthly written in-water monitoring reports will be acceptable (See Appendix I).

1.2.4 Relocation of Utility Lines

Beaver Creek
FHWA will install one new telephone pole about 30 feet from the creek on the southwest side. There is one large cottonwood near the pole location that will need to have some branches trimmed to accomodate the phone line. The new aerial line will extend from this pole to an existing pole at the intersection of SR 20 and Lower Beaver Creek Road.

Fraser Creek
FHWA will install one new telephone pole about 60 feet southwest of the creek. The buried phone line will go aerial at this point and will be installed on the existing power poles under the power lines to a point nearly 300 feet east of the creek crossing where it will again be routed under ground. East of the culvert inlet (upstream) there are six to eight trees (mostly alders) that may need to have the tops trimmed to permit the phone line to be installed under the power lines.

1.2.5 Removal and Planting of Vegetation

Approximately 16,000 square feet (0.37 acres) of revegetation will be required after the projects are completed. Disturbed areas will be mulched, seeded or planted using native trees, shrubs and grasses. Mulching materials can include: soil binders, straw, wood cellulose fiber, bark or wood chips, sawdust, jute matting or wood erosion control blanket. Perennial cover will be reestablished using at a minimum; Coyote and Scouler's willow, blue elderberry, mock orange, golden current, serviceberry, wax current, Wood's and Baldhip rose, red osier dogwood, black cottonwood, water birch and choke cherry. Grass seed will be applied at the rate of 40 pounds per acre as specified in the BA, on all areas requiring roadside seeding within the action area. Seeding, fertilizing and mulching will occur between August 15 and November 15.

1.3 Description of the Action Area

Under the ESA, the "Action Area" is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area of the action (50 C.F.R. 402.02 and 402.14(h)(2)). For the purposes of this Opinion, the Action Area includes Frazer Creek at the SR20 mile post (MP) 206.93 culvert crossing and roughly 100 feet upstream and 200 feet downstream as it flows next to the segment of highway to be resurfaced. At the Beaver Creek location the Action Area includes approximately 100 feet upstream and up to 500 feet downstream of the culvert. Because of the channel realignment at Beaver Creek, FHWA anticipates the downstream impact to be greater than at the Frazer Creek project. FHWA expects downstream impacts to be very low in both cases because of the normal low flows during the project work window and erosion control measures.

The Action Area also includes the adjacent riparian zone within the construction area and all areas affected by the project including the staging area and roadways.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

The objective of this Opinion is to determine whether the proposed project is likely to jeopardize the continued existence of UCR chinook and UCR steelhead, or result in the destruction or adverse modification of habitat for UCR spring chinook or UCR steelhead.

2.1.1 Status of the Species and Habitat

The listing status and biological information for the NOAA Fisheries listed species are described in Table 1.

Species (Biological Reference)	Critical Habitat Designation	Listing Status Reference
Spring chinook from Washington, Idaho, Oregon and California, (Meyers et al.1998).	No critical habitat designated at this time.	The UCR ESU is listed as Endangered under the ESA, (64 Fed. Reg. 14308, March 24, 1999).
Steelhead from Washington, Idaho, Oregon and California, (Busby, et al. 1996).	No critical habitat designated at this time.	The UCR ESU is listed as Endangered under the ESA, (64 Fed. Reg. 14517, March 25, 1999).

Table 1. References to Federal Register Notices containing additional information concerning listing status, and biological information for listed and proposed species considered in this biological opinion.

The information presented below summarizes the status of species and ESUs that are the subject of this consultation.

The UCR steelhead ESU, listed as endangered on August 18, 1997 (62 Fed. Reg. 43937), includes all natural-origin populations of steelhead in the Columbia River basin upstream from the Yakima River, Washington, to the U.S./Canada border. The Wells Hatchery stock is included among the listed populations. Critical habitat is not presently designated for UCR steelhead.

The UCR spring-run chinook salmon ESU, listed as endangered on March 24, 1999 (64 Fed. Reg. 14308), includes all natural-origin, stream-type chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat, and Methow River basins. All chinook in the Okanogan River are apparently ocean-type and are considered part of the UCR summer- and fall-run ESU (Meyers et al. 1998). The spring-run components of the following hatchery stocks are also listed: Chiwawa, Methow, Twisp, Chewuch, and White rivers and Nason Creek. Critical habitat is not presently designated for UCR chinook.

2.1.1.1 UCR Steelhead

Life History. In a study by Chapman et al. (1994), UCR steelhead smolts were shown to migrate at ages ranging from one to five years, with most populations smolting at ages two or three. Peven et al. (1994) observed smolt ages ranging from one to seven years, with the highest percentage smolting at ages two and three. Based on limited data, Busby et al. (1996) estimated that steelhead from the Wenatchee and Entiat Rivers return to fresh water after one year at sea, whereas Methow River steelhead are primarily age two. The majority of steelhead spend two years in the ocean before migrating back to their natal stream (Chapman et al. 1994) where, like other steelhead ESUs, they remain in fresh water up to a year prior to spawning. Peven (1990) speculated that steelhead that rear in cold headwater tributaries of the upper Columbia basin streams can be "thermally fated" to either a resident life history (rainbow trout), or to spending extra years in freshwater until the physiological age for smoltification is reached. The relationship between anadromous and non-anadromous *O. mykiss* in this geographic area is unclear.

Habitat and Hydrology. The Chief Joseph and Grand Coulee dam construction caused blockages of substantial habitat, as did that of smaller dams on tributary rivers. Habitat issues for this ESU currently relate mostly to irrigation diversions and hydroelectric dams, as well as to degraded riparian and instream habitat from urbanization and livestock grazing.

Hatchery Influence. Hatchery fish are widespread and escape to spawn naturally throughout the region. Spawning escapement is dominated by hatchery-produced fish. Chapman et al. (1994) described several management actions that have probably had a substantial influence on the Upper Columbia populations structure. First, the construction of Grand Coulee Dam in 1939 blocked anadromous salmonids from 1,140 miles of the upper Columbia River. To preserve the

runs, the Grand Coulee Fish Maintenance Project (GCFMP) (1939-1943), trapped returning steelhead and salmon at Rock Island Dam for relocation to upstream tributaries or to new hatcheries in Leavenworth, Entiat and Winthrop. One of the results has been substantial mixing of steelhead from all areas upstream of Rock Island Dam. This mixing was probably not complete because non-anadromous and five plus year old *O. mykiss* were not trapped. After the GCFMP, extensive artificial propagation of steelhead in the Upper Columbia area resumed in the 1960's (Chapman et al. 1994). Steelhead smolts resulting from broodstock trapped at either Priest Rapids or Wells Dams have been extensively planted throughout the Wenatchee, Entiat and Methow Rivers. At least since the 1985/86 cycle, between 71% and 90% of the steelhead that passed Priest Rapids Dam were hatchery produced (NMFS 2001). Peven (1992) reported that in 1987, hatchery steelhead made up 73% of the steelhead run entering the Columbia River. Busby et al. (1996) estimated the proportion of hatchery fish in spawning escapement to be 81% in the Methow and Okanogan rivers. An estimate of the overall run returning to spawn naturally in this ESU can be obtained from counts of adults at Priest Rapids Dam minus returns to hatcheries above the dam. The five- year (1990-94) geometric mean of this dam-count-based estimate is approximately 4,880 spawners. Recent five-year (1989-1993) average natural spawning escapement estimates are 450 steelhead in the Methow and Okanogan rivers. This estimate does not account for recreational harvest or prespawning mortality, so it must be viewed as an upper bound on adults returning to the ESU. Individual populations within the ESU are all quite small, with none averaging over 150 adults in recent years (Busby et al. 1996).

These factors suggest that at least since the late 1960's or 1970's all steelhead in the Wenatchee, Entiat and Methow may have been part of a single independent population, with the hatcheries as the primary source of productivity. The Wells Fish Hatchery Complex and the East Bank Fish Hatchery Complex were both designed to implement supplementation programs for naturally spawning populations of the Methow and Wenatchee rivers, respectively (Chapman et al. 1994). Hence there are now at least two potentially demographically independent populations of steelhead in the Upper Columbia River area.

There is a caveat to this information, however. Several studies have suggested that hatchery produced steelhead may not be as successful at reproducing in the wild as are wild steelhead (Leider et al. 1990; Reisenbichler 1997; Reisenbichler and McIntyre 1977). If hatchery produced steelhead spawning naturally in the Upper Columbia tributaries are much less successful at producing offspring than their wild counterparts, then the demographic and genetic contributions of hatchery fish to these wild spawning areas could be much less than will be predicted from the total proportion of naturally spawning hatchery fish. For example, under the extreme assumption that naturally spawning hatchery fish produce no returning adult progeny, then naturally spawning steelhead in different tributaries could be reproductively isolated despite the high proportion of common-origin hatchery produced fish spawning in the same tributaries.

Population Trends and Risks. We have no estimates of historical abundance specific to this ESU. For the UCR steelhead ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.94 to 0.66, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild

origin (McClure et al. 2000). NOAA Fisheries has also estimated the risk of absolute extinction for the aggregate UCR steelhead population, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (i.e., hatchery effectiveness = 0), the risk of absolute extinction within 100 years is 0.25 (McClure et al. 2000). Assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100%), the risk of absolute extinction within 100 years is 1.00 (McClure et al. 2000).

A second caveat is the relationship between anadromous and resident *O. mykiss*. In their status review of West Coast steelhead, Busby et al. (1996) concluded that, in general, steelhead ESUs include native resident *O. mykiss* in areas where they can interbreed, and mentioned the Upper Columbia River as an area in which the role of resident fish may be particularly important. If native resident fish are "counted" as part of the natural component of the Upper Columbia River steelhead population, this will have the effect of increasing the apparent wild:hatchery ratio and could suggest that demographically isolated populations of *O. mykiss* could persist in the different tributaries despite the large-scale steelhead hatchery programs. At this time, however, there are insufficient data to effectively evaluate the demographic importance of resident *O. mykiss* to Upper Columbia steelhead populations.

2.1.1.2 UCR Spring Chinook

Life History. UCR chinook are considered stream-type fish, with smolts migrating as yearlings. Most stream-type fish mature at four years of age. Few coded-wire tags are recovered in ocean fisheries, suggesting that the fish move quickly out of the north central Pacific and do not migrate along the coast. Spring chinook of the Upper Columbia reach peak abundance in the lower Columbia River in April and May (Chapman et al. 1995, Myers et al. 1998). A study by Chapman et al. (1995) for the three upper Columbia River Public Utility districts indicate that 50% of the spring chinook run passes Rock Island Dam in mid-May. Passage at Wells Dam occurs slightly later. Spring chinook enter the mainstem portions of tributaries from late April through July, and hold in deeper pools and under cover until onset of spawning. They may spawn near holding areas or move upstream into smaller tributaries. Spawning occurs from late July to September, peaking about mid-August. Most fish in this ESU smolt after one winter of life post-emergence. Most return to freshwater after two winters at sea although 20-40% of adult spring chinook spend three winters at sea and return at larger size. Precocious males, or jacks, return after one winter at sea. Some males mature sexually in fresh water without migrating to the sea, and probably contribute to the egg fertilization (Chapman et al. 1995).

Habitat and Hydrology. Spawning and rearing habitat in the Columbia River and its tributaries upstream of the Yakima River includes dry areas where conditions are less conducive to survival than in many other parts of the Columbia basin. Salmon in this ESU must pass up to nine Federal and private dams, and Chief Joseph Dam prevents access to historical spawning grounds farther upstream. Degradation of remaining spawning and rearing habitat continues to be a major concern associated with urbanization, irrigation projects, and livestock grazing along

riparian corridors. Overall harvest rates are low for this ESU, currently less than 10% (ODFW and WDFW 1993.

Hatchery Influence. The GCFMP apparently did not allow for any natural spawning of Upper Columbia River chinook from 1939 to 1943, since it was reported that all fish were collected for brood stock. Past hatchery introductions include fish from several non-indigenous sources. Within the Upper Columbia stocks, mixed Wenatchee, Entiat, Methow and above Grand Coulee Dam chinook were delivered to tributaries as adults and/or juveniles, forming the basis for adaptation beginning in the 1940s (Chapman et al. 1995). Upriver spring chinook trapped at Bonneville Dam have also provided the core broodstock at Leavenworth, Entiat, and Winthrop federal hatcheries. Spring-run chinook salmon from the Carson National Fish Hatchery (a large composite, nonnative stock) were introduced into, and have been released from local hatcheries (Leavenworth, Entiat, and Winthrop National Fish Hatcheries [NFH]). Little evidence suggests that these hatchery fish stray into wild areas or hybridize with naturally spawning populations. In addition to these national production hatcheries, two supplementation hatcheries are operated by the WDFW in this ESU. The Methow Fish Hatchery Complex (operations began in 1992) and the Rock Island Fish Hatchery Complex (operations began in 1989) were both designed to implement supplementation programs for naturally spawning populations on the Methow and Wenatchee rivers, respectively (Chapman et al. 1995).

Population Trends and Risks. There are no estimates of historical abundance for the Upper Columbia River spring chinook ESU. Three independent populations of spring-run chinook salmon are identified for the ESU including those that spawn in the Wenatchee, Entiat, and Methow basins (NMFS 2001). Following reduction of harvest and the initiation of the GCFMP in 1939-1943, counts of returning spring chinook increased at Rock Island Dam have fluctuated from a peak of about 26,000 in the mid-1980's, to a low of 792 in 1995. An estimate of the overall run returning to spawn naturally in this ESU can be obtained from counts of adults at Priest Rapids Dam. The five year (1990-1994) geometric mean of this dam count based estimate is approximately 4,880 spawners. The spring run chinook abundance in the ESU is quite low with escapements in 1994-1996 the lowest in at least the last 60 years (Myers et al. 1998). At least six populations of Upper Columbia River spring chinook salmon in this ESU have become extinct, and almost all remaining naturally spawning populations have fewer than 100 spawners (Busby et al 1996). In addition to extremely small population sizes, both recent and long-term trends in abundance for ten populations have been estimated from available data. All ten short-term trends were downward, with eight populations exhibiting rates of decline exceeding 20% per year. In NMFS 2000, it is estimated that survival must improve from 51% to 178% if this species is to survive and recover.

For the UCR spring chinook salmon ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.85 to 0.83, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (Tables B-2a and B-2b in McClure et al. 2000). NOAA Fisheries has also estimated median population growth rates and the risk of extinction for the three spawning populations identified by NOAA Fisheries (NMFS 2001) using the same range of assumptions about the

relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (i.e., hatchery effectiveness = 0), the risk of extinction within 48 years ranges from 0.71 for the Methow River to 1.00 for the Wenatchee River (Table B-5 in McClure et al. 2000). At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100%), the risk of extinction within 48 years is increases to 0.82 for the Methow River stock and 1.00 for both the Entiat and Wenatchee stocks (Table B-6 in McClure et al. 2000).

NOAA Fisheries has also used population risk assessments for UCR spring chinook salmon and steelhead ESUs from the draft quantitative analysis report (Cooney 2000). Risk assessments described in that report were based on Monte Carlo simulations with simple spawner/spawner models that incorporate estimated smolt carrying capacity. Population dynamics were simulated for three separate spawning populations in the UCR spring chinook salmon ESU, the Wenatchee, Entiat, and Methow populations. The Quantitative Analysis Report (QAR) assessments (Cooney 2000) showed extinction risks for UCR spring chinook salmon of 50% for the Methow, 98% for the Wenatchee, and 99% for the Entiat spawning populations. These estimates are based on the assumption that the median return rate for the 1980 brood year to the 1994 brood year series will continue into the future.

2.1.2 Evaluating the Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 C.F.R. 402 (the consulting regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to adversely modify habitat. This analysis involves the initial steps of (1) defining the biological requirements and current status of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

NOAA Fisheries then evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making the determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life history stages that may occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize the survival or recovery of a listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

Furthermore, NOAA Fisheries evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' habitat. NOAA Fisheries must determine whether habitat modifications appreciably diminish the value of habitat for both the survival and recovery of the listed species. NOAA Fisheries identifies those effects of the action that impair the function of any essential element of habitat. NOAA Fisheries then considers whether such impairment appreciably diminishes the habitat's value for the species' survival and recovery. If

NOAA Fisheries concludes that the action will adversely modify habitat, it must identify any reasonable and prudent alternatives available.

Guidance for making determinations of jeopardy and adverse modification of habitat are contained in NOAA Fisheries' document: The Habitat Approach, Implementation of section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids, August 1999 (available online at: www.nwr.noaa.gov/1habcon/habweb/pubs/newjeop9.pdf).

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. The NOAA Fisheries' habitat analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration and spawning of the listed salmon under the existing environmental baseline.

2.1.2.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species; taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its original decision to list the species for protection under the ESA. Additionally, the assessment will consider any new information or data that are relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to naturally reproducing population levels at which time, protection under the ESA will be unnecessary. Species or ESUs not requiring ESA protection have the following attributes: population sizes large enough to maintain genetic diversity and heterogeneity, the ability to adapt to and survive environmental variation, and are self-sustaining in the natural environment.

UCR spring chinook and UCR steelhead have similar basic biological requirements. These requirements include food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), clean spawning substrate, and unimpeded migratory access to and from spawning and rearing areas (adapted from Spence *et al.* 1996).

NOAA Fisheries has related the biological requirements for listed salmonids to a number of habitat attributes, or pathways, in the Matrix of Pathways and Indicators (MPI); available online at: www.nwr.noaa.gov/1habcon/habweb/pubs/matrix.pdf). These pathways (water quality, habitat access, habitat elements, channel condition and dynamics, flow/hydrology, watershed conditions, disturbance history, and riparian reserves) indirectly measure the baseline biological health of listed salmon populations through the health of their habitat. Specifically, each pathway is made up of a series of individual indicators (e.g., indicators for water quality include temperature, sediment, and chemical contamination.) that are measured or described directly

(NMFS 1996). Based on the measurement or description, each indicator is classified within a category of the properly functioning condition (PFC) framework: (1) properly functioning; (2) at risk; or (3) not properly functioning. Properly functioning condition is defined as "the sustained presence of natural habitat forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation."

The specific biological requirements to be affected by the proposed action include habitat access, and water quality. Further, the proposed action is likely to affect habitat attributes including streambank condition, floodplain connectivity and riparian reserves.

2.1.2.2 Factors Affecting the Species within the Action Area

Section 4(a)(1) of the ESA and NOAA Fisheries listing regulations (50 C.F.R. 424) set forth procedures for listing species. The Secretary of Commerce must determine, through the regulatory process, if a species is endangered or threatened based upon any one or a combination of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors affecting its continued existence.

The proposed action includes activities that will have some level of effects with short-term impacts from categories (1) and (5). The characterization of these effects and a conclusion relating the effects to the continued existence of the subject species of this consultation are provided in Section 2.1.3.

2.1.2.3 Environmental Baseline

The environmental baseline represents the current basal set of conditions to which the effects of the proposed action will be added. The term "environmental baseline" means "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process " (50 C.F.R. 402.02).

The major factors influencing the environmental baseline within the action area include: (1) the presence of hydroelectric dams; (2) fish passage barriers created by irrigation diversions; (3) water use for irrigation, grazing, and mining, and; (4) natural hydrologic and geomorphic processes.

Habitat alterations and differential availability impose an upper limit on the production of naturally spawning populations of salmon. The National Research Council Committee on Protection and Management of Pacific Northwest Anadromous Salmonids identified habitat problems as a primary cause of declines in wild salmon runs (NRCC 1996). Some of the habitat impacts identified were the fragmentation and loss of available spawning and rearing habitat,

migration delays, degradation of water quality, removal of riparian vegetation, decline of habitat complexity, alteration of streamflows and streambank and channel morphology, alteration of ambient stream water temperatures, sedimentation, and loss of spawning gravel, pool habitat and large woody debris (NMFS 1998, NRCC 1996).

Anadromous fish runs in this ESU have been negatively affected by a combination of habitat alteration and hatchery management practices. The nine downstream, mainstem dams on the Columbia are a significant source of habitat degradation for this ESU. The dams act as a partial barrier to passage, kill out-migrating smolts in their turbines, raise temperatures throughout the river system, and have created lentic refugia for salmonid predators. In addition to the mainstem dams, a hydroelectric dam across the Methow River at Pateros blocked all fish passage between 1915 and 1929. By the time the dam was removed, the Methow River run of coho was extinct, spring and summer chinook runs, as well as steelhead were severely depressed.

Artificial propagation programs have also had a considerable influence on this ESU. During the GCFMP virtually all spring-run chinook salmon and most steelhead reaching Rock Island Dam, including those destined for areas above Grand Coulee Dam, were collected, and they or their progeny were dispersed into streams in this ESU (Andonagi 2000). Some ocean-type fish were undoubtably also incorporated into this program. Spring-run chinook escapements to the Wenatchee, Entiat, and Methow Rivers were severely depressed prior to the GCFMP but increased in succeeding years. Subsequently, widespread transplants of Carson stock spring chinook salmon have also contributed to erosion of the genetic integrity of this ESU. Despite ongoing hatchery programs, resource managers have not been able to reestablish the salmon and steelhead populations to self-sustaining levels. Failure can be attributed to a number of factors including, passage problems and mortality associated with nine hydroelectric facilities on the mainstem Columbia River, unfavorable ocean conditions, harvest pressures, and degradation of ecological processes and habitat within the Methow watershed (WDFW et al. 1990; Peven, 1992; Caldwell and Catterson 1992; WDFW 1993; Williams et al. 1996).

Climate in this area includes extremes in temperatures and precipitation; most precipitation falls in the mountains as snow. Streamflow in this area is provided by melting snowpack, groundwater, and runoff from alpine glaciers (T. Robison, Wenatchee National Forest (WNF) Hydrologist, personal communication 2000)

In years when moisture availability is limited by climatic conditions, instream flows become severely reduced resulting in dewatered reaches, winter icing, and higher summertime water temperatures. Depending on the severity of the climatic conditions, the duration and extent of low instream flows and dewatered reaches can expand. These conditions restrict salmonid access to habitat, dewater redds, and strand juveniles, resulting in direct mortality to salmonids. Water withdrawals, in-stream barriers, grazing, mining, and development are serious local concerns.

Much of the upper Methow River lies upstream from irrigation return flows, and in a permeable glacial deposit. Thus it tends to be a losing stream where the stream surface lies above the

adjacent groundwater table. Not influenced by irrigation, some reaches of the upper Methow are alternately watered and dewatered (C. Davis, WNF Soils Specialist personal communication 2001). In the Methow subbasin, irrigation is known to dewater portions of Gold Creek, Benson Creek, and Beaver Creek (J. Molesworth, WNF-Methow Valley Ranger District Fisheries Biologist, personal communication 2001). Flow is much reduced by irrigation in the Twisp River, Wolf Creek, Goat Creek and Early Winters Creek (Andonagi 2000). Additionally, numerous man-made fish passage barriers and unscreened water diversions have been identified in the Beaver Creek drainage. A fish passage barrier and screen inventory conducted in 1998 by WDFW (Gower and Espie 1999 as cited in Hancock 2002) identified 78 man-made fish passage barriers (includes both partial and full barriers) and 26 unscreened water diversions (includes both pump and gravity diversions).

2.1.3 Effects of the Proposed Action

The NOAA Fisheries' ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species or Habitat together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." Direct effects are immediate effects of the project on the species or its habitat, and indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur (50 C.F.R. 402.02).

2.1.3.1 Direct Effects

Direct effects result from the agency action and include the effects of interrelated and interdependent actions. Future Federal actions that are not direct effects of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated.

2.1.3.1.1 Fish Handling

After isolating the work area with block nets, a trained fish biologist will use seines and dip nets to capture and/or move fish. This handling has been shown to increase plasma levels of cortisol and glucose in fish (Frisch and Anderson 2000; Hemre and Krogdahl 1996). Subsequently, electrofishing may be conducted, but only after less potentially harmful techniques (seines and dip nets) have been used. Electrofishing may result in direct mortality of young-of-the-year or juvenile steelhead. Physical injuries from electrofishing include internal hemorrhaging, spinal misalignment, or fractured vertebrae. Although the practice is potentially hard on fish, the electrofishing is intended to further locate residual fish in the isolated work area to reduce incidental take. The likelihood of injury or mortality will be minimized by: (1) using a qualified biologist to ensure proper capture, handling, and release of fish; and (2) using seines and nets to "herd" or transfer fish prior to any electrofishing.

The temporary diversion of the creek into a culvert may result in the incidental stranding of juvenile steelhead. Additionally, the diversion of water through a culvert will impede the

movement of steelhead for approximately 15 days. A fish/debris screen will be installed upstream of the bypass to minimize the chance of any fish being caught in the bypass. The effects of the temporary stream diversion will be minimized by sizing the culvert to ensure fish passage. Moreover, adverse affects to migration will be minimized further by restricting construction activities to July 15 to September 30, when adult steelhead migration and spawning have been completed and out-migrating smolts are expected to have emigrated.

2.1.3.1.2 Water Quality

The temporary negative effects associated with excavation, the installation of culverts, channel realignment, construction of streambank protection segments, and the back-filling and removal of the temporary stream diversion structure include short-term increases in turbidity levels. Deposition of fine sediment can significantly degrade instream spawning habitat, reduce survival from egg to emergence (Phillips et al. 1975), and reduce intergravel cover (Spence et al. 1996). Suspended sediments can cause sublethal effects such as elevated blood sugars and cough rates (Servizi and Martens 1992), physiological stress, and reduced growth rates. Elevated turbidity levels can reduce the ability of salmonids to detect prey (Barrett 1992), cause gill damage (Sigler et al. 1984, Lloyd et al. 1987), and avoidance by juveniles (Bisson and Bilby 1982; Sigler et al. 1984). Additionally, short-term pulses of suspended sediment have been shown to influence territorial, gill-flaring, and feeding behavior of salmon under laboratory conditions (Berg and Northcote 1985).

These negative effects will be minimized through recommended restrictions in timing and duration of construction, and the use of temporary erosion and sediment control measures identified in the BA. It is expected that listed species present during construction will seek refugia or will avoid portions of stream with elevated turbidity levels. Overall, the temporary increase in turbidity is not expected to influence the environmental baseline over the long term.

2.1.3.1.3 Disturbance of Streambed

The removal of the old culverts, installation of new culverts and weirs, and channel realignment will disturb the substrate of Beaver and Frazer Creeks. In-stream work may harm fish by homogenizing the substrate. The temporary diversion of the creek through a culvert will also cause a temporal loss of macroinvertebrate habitat. Aquatic invertebrates serve as an important source of prey for salmonids, and the loss of aquatic invertebrate habitat may reduce foraging opportunities for listed salmonids. Effects associated with the disruption of the streambed is likely to be short-lived as invertebrates tend to rapidly recolonize disturbed areas (Allan 1995). To minimize the disturbance of the creek bed, the contractor will: 1) complete all in-channel work within dry areas.

2.1.3.1.4 Removal of Riparian Vegetation

The culvert replacement will result in a temporary loss of riparian function caused by the removal of vegetation. Riparian vegetation links terrestrial and aquatic ecosystems, influences

channel processes, contributes organic debris to streams, stabilizes streambanks, and modifies water temperatures (Gregory et al. 1993). Elevated water temperatures may adversely affect salmonid physiology, growth and development, alter life history patterns, induce disease, and may exacerbate competitive predator-prey interactions (Spence et al. 1996). The removal of existing riparian vegetation could adversely affect the action area. However under the proposed action, the loss of riparian function should be minimal because of the small footprint of each project. Vegetation loss will be mitigated by seeding and planting upland and riparian areas with native plant stock that will minimize adverse impacts to riparian function in the action area. Temporary negative effects of these activities on UCR steelhead, UCR spring chinook, and aquatic habitat indicators will be limited by implementing construction methods and approaches included in the project design, best management practices (BMP's) outlined in the BA, and by following the terms and conditions in section 2.2.3 of this Opinion.

2.1.3.1.5 Upstream Fish Passage

The replacement of culverts and channel realignment are designed to improve fish passage. Current conditions present velocity barriers for migrating fish and negatively impact water quality when stream flows come in contact with the fill slopes. The expected outcome is a slight improvement in water quality, improved upstream passage of migrating adult spawners, and safer downstream migration of juveniles. In May 2002, Wenatchee National Forest fisheries personnel (D.Hopkins, personal comm.) observed adult steelhead trout building redds upstream of the culvert replaced at the mouth of Beaver Creek in 2001.

2.1.3.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur (50 C.F.R. 402.02). Indirect effects can occur outside of the area directly affected by the action. Indirect effects can include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or they are a logical extension of the proposed action.

2.1.3.2.2 Construction Equipment

As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. These contaminants could injure or kill aquatic organisms if spilled into a water body or the adjacent riparian zone. However, all equipment fueling and maintenance will occur in designated staging areas at least 150-feet from the stream channel. Equipment operated within 150-feet of any water body will be inspected daily for leaks and, if necessary, repaired before leaving the staging area. Stationary power equipment operated within 150-feet of any wterbody will be diapered to prevent leaks, unless otherwise approved in writing by NOAA Fisheries.

2.1.3.3 Population Level Effects

As described in Section 2.1.1.1 and 2.1.1.2, NOAA Fisheries has estimated the median population growth rate (lambda) for each species potentially affected by the implementation of the Beaver and Frazer Creeks culvert replacement project. The proposed action will result in short term impacts to listed salmonids. Conservation measures and BMP's are expected to reduce the potential for harm to listed fish by reducing the effects of turbidity, streambed and bank disturbance, and fish removal. Therefore, NOAA Fisheries does not believe that the proposed action is likely to influence existing population trends or risks for listed species within the action area.

2.1.4 Cumulative Effects

Cumulative effects are defined in 50 C.F.R. 402.02 as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For this analysis, cumulative effects for the general action area are considered. Future Federal actions, including the ongoing operation of hatcheries, fisheries, and land management activities have been or will be reviewed through separate section 7 consultation processes.

NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years. As the human population in the state continues to grow, demand for actions similar to the proposed project likely will continue to increase as well. Each subsequent action by itself may have only a small incremental effect, but taken together they may have a significant effect that will further degrade the watershed's environmental baseline and undermine the improvements in habitat conditions necessary for listed species to survive and recover.

A culvert passage barrier at the mouth of Beaver Creek was replaced in 2001 and UCR steelhead were observed in the spring of 2002 moving upstream into newly accessible stream habitats. The culverts at the lower ends of Beaver and Frazer Creeks are the second step (moving upstream, removing barriers) in the process of providing fish passage in the Beaver Creek subwatershed. Several other private groups and state agencies are designing projects to improve passage above the Beaver and Frazer Creek culverts. Therefore, the proposed projects are a necessary step in reestablishing fish passage in the Beaver Creek subwatershed. Overall, the long-term objective is to improve fish habitat, access and hydrologic function of Beaver and Frazer Creeks. Consequently, NOAA Fisheries does not believe the proposed projects are likely to negatively influence the existing population trends or risks for NOAA Fisheries' listed species within the action area. On the contrary, NOAA Fisheries believes that the proposed projects will provide an incremental improvement in habitat conditions, particularly for UCR steelhead.

2.1.5 Conclusion/Opinion

NOAA Fisheries' jeopardy analysis is based upon the present status of the species, environmental baseline within the action area, and the effects of the proposed action. The analysis takes into account the species' status because determining the effect upon a species' status is the essence of the jeopardy determination. Depending on the specific considerations of

the analysis, actions that are found likely to impair presently properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat towards properly functioning condition at the population or ESU scale will generally be determined likely to jeopardize the continued existence of listed salmon, adversely modify habitat, or both. Specific considerations include whether habitat condition was an important factor for the decline in the listing decision, changes in population or habitat conditions since listing, and any new information that has become available.

NOAA Fisheries has determined that the effects of the proposed action will not jeopardize the continued existence of UCR spring chinook, or UCR steelhead. The proposed action is not expected to degrade baseline habitat functions necessary for the survival and recovery of any of the subject species. The action is likely to cause temporary, short-term disturbance in ground cover and elevated turbidity in the area of construction and for a relatively short distance downstream. However, timing restrictions, erosion controls and revegetation plans included in the proposed projects are considered sufficient to relieve these impacts. Furthermore, the underlying intent of the project includes improving fish access to existing habitat. Accordingly, NOAA Fisheries has determined that the activities described in this Opinion will not cause levels of take or destroy habitat that will appreciably reduce the likelihood of survival and recovery of the subject listed species.

2.1.6 Reinitiation of Consultation

Consultation must be reinitiated if (1) the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; or (3) a new species is listed or Habitat is designated that may be affected by the action (50 C.F.R. 402.16). The FHWA must monitor the implementation of listed reasonable and prudent measures and terms and conditions of the incidental take statement. The FHWA must reinitiate consultation if elements of the proposed project are implemented in a manner that is inconsistent with, or deviates from, the terms and conditions of this consultation. To reinitiate consultation, the FHWA must contact the Habitat Conservation Division (Washington Branch Office) of NOAA Fisheries. At the request of reinitiation, the protective coverage of section 7(o)(2), the Incidental Take Statement, will lapse.

2.2 Incidental Take Statement

Section 9 of the ESA and Federal Regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as spawning, rearing, feeding, and migrating (50 C.F.R. 222.106). Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or applicant carrying out an otherwise lawful activity. Under the terms of sections 7(b)(4) and 7(o)(2), taking

that is incidental to, and is not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary; for the exemption in section 7(o)(2) to apply, they must be implemented by the action agency. The FHWA has a continuing duty to ensure that the action is implemented in accordance with this incidental take statement. If the FHWA fails to comply with these terms and conditions, the protective coverage of section 7(o)(2) will lapse.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and set forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Take

NOAA Fisheries anticipates that incidental take of *O. mykiss* (possibly including potential UCR steelhead) is reasonably likely to result from the project activities described in the BA. Despite the use of the best scientific and commercial data available, NOAA Fisheries cannot estimate a specific amount of incidental take of individual fish. However, NOAA Fisheries believes that there are several mechanisms through which take of UCR steelhead may occur. Direct harm may result from fish handling and removal, installation and construction activities (e.g., sediment mobilization, stream dewatering, and short term loss of riparian habitat). Timing restrictions are designed to allow construction to occur when daytime water temperatures in the action area are generally above the preferred temperatures for listed fish. This restriction reduces the likelihood of take of UCR steelhead to near zero. However, a total of 16,000 square feet (0.37 acres) of riparian and upland area is expected to be disturbed during construction. All disturbed areas will be protected from erosion (see section 2.2.3, Terms and Conditions No. 3), revegetated and monitored to ensure vegetative recovery (see section 2.2.3, Terms and Conditions No. 4 and 5). Indirect harm, through long term habitat modification could occur if the minimizing measures (i.e., BMPs) or Terms and Conditions's outlined in section 2.2.3 are disregarded.

2.2.2 Reasonable and Prudent Measures

The following reasonable and prudent measures (RPMs) are necessary and appropriate for minimizing take of endangered UCR spring chinook, and endangered UCR steelhead. These RPMs are partially integrated into the BA and proposed project. NOAA Fisheries has included them here to provide further detail as to their implementation.

1. The FHWA will minimize the impacts from construction activities within the OHWM, by limiting the timing, duration, and extent of construction within the OHWM.

2. The FHWA will minimize the impacts from isolation and fish handling, by ensuring that appropriate methods are used that reduce risk of injury to listed species.

3. The FHWA will minimize the impacts from construction activities in riparian or adjacent upland areas through the use of effective erosion and pollution control measures throughout the area of disturbance and for the life of the project. The measures used shall eliminate or reduce to the maximum extent possible the movement of soils and sediments both into and within the creek, and stabilize bare soil over both the short and long term.

4. The FHWA will minimize the effect of loss of instream habitat, by reducing or eliminating impacts to riparian and instream habitat, or where impacts are unavoidable, to replace or restore lost riparian and instream function.

5. The FHWA will ensure effectiveness of implementation of the RPMs, monitor and evaluate the erosion control measures and plantings for site restoration both during and following construction, and meet criteria as described below in the terms and conditions.

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the FHWA must ensure that WSDOT complies with the following terms and conditions (T&Cs), which implement the RPMs described above. Implementation of the terms and conditions within this Opinion will further reduce the risk of impacts to UCR spring chinook and UCR steelhead. These T&Cs are non-discretionary.

1. Implement RPM No.1 (impacts to aquatic organisms and habitat within the OHWM) by conducting the following:

   a. Work within the active channel of Beaver or Frazer Creek will be completed between July 15 and September 30. Any additional extensions of the in-water work period must first be submitted in writing, approved by and coordinated with NOAA Fisheries and WDFW.

   b. Minimize alteration or disturbance within the OHWM by using the following procedures: any instream large wood or riparian vegetation that is moved or altered during construction will stay on site or be replaced with a functional equivalent; all tree removal will be mitigated for onsite by a minimum two to one ratio; and any native channel material, topsoil, and vegetation removed will be stockpiled for redistribution in the project area (see T&C 4b). Streambank protection structures are constructed using the Integrated Streambank Protection Guidelines (WDFW et al. 2000).

   c. Ensure that all water intakes used for the project, including pumps used to work in-water work areas, have fish screens installed, operated, and maintained according to NOAA Fisheries' fish screen criteria.(NMFS 1995, 1996). Water withdrawal rates from waters

containing listed fish will not exceed one percent of the flow of the supply stream. Additionally, FHWA shall be responsible for informing all contractors of their obligations to comply with existing, applicable statutes.

2. To implement RPM No. 2 (isolation and fish handling), the FHWA shall ensure that the following requirements are fully implemented:

   a. The work area is well isolated from the flowing stream using the measures described in the BA and which are incorporated here by reference.

   b. A biologist experienced with work-area isolation is on site to ensure the safe handling of all ESA-listed fish and will conduct or supervise the entire capture and release operation.

   c. The capture team complies with NOAA Fisheries' electrofishing guidelines (NMFS 2000).

   d. The capture team handles ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during capture and transfer procedures to prevent the added stress of out-of-water handling.

   e. Captured fish are released as near as possible to the capture area.

   f. ESA-listed fish are not transferred to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

   g. Other Federal, state, and local permits necessary to conduct the capture and release activity are obtained.

   h. NOAA Fisheries or its designated representative will be allowed to accompany the capture team during the capture and release activity, and are allowed to inspect the capture team's capture and release records and facilities.

   i. In-water Construction Monitoring Report forms (attached as Appendix I) for all salmonids encountered during isolation and fish-movement operations will be provided to NOAA Fisheries after the in-water construction time period. See T& C 5.e for specific monitoring requirements.

3. To implement RPM No. 3 (construction activities), the FHWA will ensure that:

   a. All temporary erosion and sediment control (TESC) and pollution control measures included in the BA are included as special provisions in the contract. A TESC plan will be prepared and reviewed by the WSDOT and FHWA prior to initiating project activities. The plan will address access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and materials storage sites, fueling operations, staging

areas, cement, mortars and bonding agents, hazardous materials, spill containment and notification, construction debris, and inspection and replacement of erosion controls. The TESC plan will outline how and to what specifications various erosion control devices will be installed to meet water quality standards, and will provide a specific inspection protocol and time response. Erosion control measures shall be sufficient to ensure compliance with applicable water quality standards and this Opinion. The TESC plan will be included in the project plans and implemented by the Contractor. A supply of emergency erosion control materials will be on hand, and temporary erosion controls will be installed and maintained in place until site restoration is complete.

b. All in-water construction work will require documentation of take using the format attached in Appendix I. FHWA will ensure that NOAA Fisheries receive monthly written reports of take beginning when the initial in-water construction activities commence until in-water construction activities cease.

c. Boundaries of clearing limits associated with site access and construction are marked to minimize disturbance of riparian vegetation, wetlands and other sensitive sites.

d. Existing roadways or travel paths will be used whenever possible.

e. No temporary stream crossing may be built at known or suspected spawning areas, or within 300 upstream of such areas if spawning may be affected.

f. Construction within the project vicinity does not begin until all temporary erosion controls (*e.g.*, sediment barriers and containment curtains) are in place. Erosion control structures will be maintained throughout the life of the contract.

g. All exposed areas will be replanted with a native seed mix. Erosion-control planting will be completed on all areas of bare soil in compliance with project specifications. The application of seeding, fertilizing, and mulching will occur between August 15 and November 15. Grass seed, of the composition, proportion and quality specified in the BA, will be applied at a rate of 40 pounds per acre on all areas requiring reseeding.

h. No surface application of nitrogen fertilizer will be used within 50 feet of any water of the State, in the action area.

i. Vehicles and machinery cross riparian areas and streams at right angles whenever possible.

j. All equipment used for in-water work is cleaned prior to entering the active channel of Beaver or Frazer Creek. External oil and grease will be removed.

k. Untreated wash and rinse water is not discharged into streams or rivers without adequate treatment.

l. All temporary access roads are obliterated when the project is completed, the soil is stabilized and all disturbed sites are revegetated. Temporary roads in wet or flooded areas will be abandoned and restored by the end of the in-water work period.

m. Material removed during excavation is only placed in a location and manner that prevents it from eroding back into the channel.

n. Measures are taken to prevent construction debris from falling into the stream or riparian area. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

o. Heavy equipment is limited to that with the least adverse effects on the environment, e.g., minimally sized, rubber tired.

p. Vehicle staging, cleaning, maintenance, refueling, and fuel storage is done 150-feet or more from any stream, water body or wetland. Overnight storage of vehicles and equipment is also in designated staging areas.

q. All vehicles operated within 150-feet of any water body are inspected daily for leaks and, if necessary, repaired before leaving the staging area.

r. All equipment operated instream is cleaned to remove all external grease, dirt, and mud before operations below the bankfull elevation.

s. Stationary power equipment operated within 150-feet of any stream or wetland is diapered to prevent leaks, unless otherwise approved by NOAA Fisheries.

t. Boulders, rock, large wood[1] or any other natural construction materials are obtained outside the riparian buffer area.

u. No treated wood[2] is used for any structure that may contact flowing water or that will be placed over water.

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[1] For purposes of this Opinion only, "large wood" means a tree, log, or rootwad large enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull width of the stream in which the wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[2] "Treated wood" means lumber, pilings, and other wood products preserved with alkaline copper quaternary (ACQ), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), copper naphthenate, chromated copper arsenate (CCA), pentachlorophenol, or creosote.

v. Treated wood debris and treated wood removed as part of a project is handled and disposed of as appropriate for this type of hazardous material.

w. The contractor develops an approved, site-specific Spill Prevention and Countermeasure or Pollution Control Plan (PCP), and is responsible for containment and removal of any contaminants released. The contractor will be monitored by the FHWA to ensure compliance with this PCP.

4. To implement RPM No. 4 (riparian habitat protection), the FHWA shall ensure that:

a. Alteration of native vegetation is minimized. Where native vegetation is altered, measures will be taken to ensure that roots are left intact. This will reduce erosion while still allowing room to work. No protection will be made of invasive exotic species (e.g., Himalayan blackberry), although no chemical treatment of invasive species will be used.

b. Riparian vegetation is replaced with a native seed mix, shrubs, and trees. All disturbed riparian areas will be replanted with native woody species at a minimum planting density of three foot on-center for cuttings and six foot on-center for rooted trees and shrubs (See T&C 1b).

c. When construction is finished, all streambanks, soils, and vegetation are cleaned up and restored as necessary to renew ecosystem processes that form and maintain productive fish habitats.

d. Fencing is installed as necessary to allow new plantings to establish and prevent trampling by livestock or humans.

5. To implement RPM No. 5 (monitoring), the FHWA shall ensure that:

a. Project structures will be inspected and monitored by qualified personnel for passage of the target fish species and life history stage. The inspections will document that the culverts meet the conditions around and through the structure to allow passage of the target fish species and life history stages. In the event that the structures do not meet the needs of the target fish species and life history stages, FHWA will notify NOAA Fisheries in writing of the need to implement corrective actions to provide passage of the target species at the project site. Written notification and approval by NOAA Fisheries will be obtained prior to any corrective action.

b. Erosion control measures as described above in T & C No. 3 are monitored and corrective action taken if necessary to ensure protection of riparian areas and waterways.

c. All riparian plantings are monitored yearly for three years to ensure that finished grade slopes are at stable angles of repose and that woody plantings are achieving a minimum of 80% cumulative survival.

d. If the success standards specified above in T & C No. 5c are not achieved, dead plantings shall be replaced to bring the site into conformance. If failed plantings are deemed unlikely to succeed, replacement plantings shall be conducted at other appropriate locations in the project area.

e. The FHWA shall send monitoring reports to document take during in-water construction (i.e., water diversion, culvert replacement, placement of rock weirs), following the format attached in Appendix I. The reports shall be submitted monthly beginning when the initial in-water construction activities commence until in-water construction activities cease. The reports shall be sent to National Marine Fisheries Service, Attention Diane Driscoll, 510 Desmond Drive SE, Suite 103, Lacey, WA 98503. Although fish kills are not expected to occur and are not authorized by this incidental take statement, all salmonid carcasses caused by the action shall be collected and delivered to NOAA Fisheries to be identified at FHWA's expense. The report and identification is critical in determining the extent of harm or kill by fish passage projects such as these and determining species occurrence in the action area. This provision is incorporated here by reference as a Term and Condition of this Incidental Take Statement.

f. By December 31 of the year following the completion of construction, the FHWA shall submit to NOAA Fisheries (Washington Branch) a monitoring report with the results of the monitoring required in terms and conditions 2.i, and 5.e above.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan (FMP). Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));

- NOAA Fisheries shall provide conservation recommendations for any Federal or State activity that may adversely affect EFH (§305(b)(4)(A));

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on

EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 C.F.R. 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 C.F.R. 600.810).

Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies regarding any activity that may adversely affect EFH, regardless of its location.

The objective of this EFH consultation is to determine whether the proposed action may adversely affect designated EFH, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse impacts to EFH resulting from the proposed action.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*)(PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of the impacts to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed actions and action area are detailed above in section 1.3 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of coho and chinook salmon.

3.4 Effects of the Proposed Action

As described in detail in section 2.1.3 of this document, the proposed action may result in detrimental short- term impacts to a variety of habitat parameters. These adverse effects are:

1. The removal of the old culverts, installation of new culverts and weirs, and channel realignment will disturb the substrate of Beaver and Frazer Creeks. In-stream work may harm fish by homogenizing the substrate. The temporary diversion of the creek through a culvert will also cause a temporal loss of macroinvertebrate habitat.

2. Temporary degradation of water quality in the action area due to an increase in turbidity and contaminants during in-water construction.

3. Temporary degradation of riparian and adjacent upland habitat due to disturbance and removal of vegetation.

3.5 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect designated EFH for coho and chinook salmon.

3.6 Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that may adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the FHWA, it does not believe that these measures are sufficient to fully address the adverse impacts to EFH described above. Consequently, NOAA Fisheries recommends that the FHWA implement the following conservation measures to minimize the potential adverse effects to EFH for chinook and coho salmon:

1. Adopt Terms and Conditions 3.h, 3.n and 5.a as described in section 2.2.3, to minimize EFH adverse effect No. 1 (impacts to aquatic organisms and habitat within OHWM).

2. Adopt Terms and Conditions 3.i, through 3.m, 3.t and 5.b as described in Section 2.2.3, to minimize EFH adverse effect No. 2 (impacts to water quality).

3. Adopt Terms and Conditions 3.c, 3.h, 3.q, 3.s, 3.u, 4.d, 5.c and 5.d as described in Section 2.2.3, to minimize EFH adverse effect No. 3 (impacts to riparian and upland areas).

3.7 Statutory Response Requirement

Please note that the MSA and 50 C.F.R. 600.920(j) require the Federal agency to provide a written response to NOAA Fisheries' EFH conservation recommendations within 30 days of its

receipt of this letter. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. In the case of a response that is inconsistent with the EFH Conservation Recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 C.F.R. 600.920(k)).

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APPENDIX - I

BEAVER-FRAZER CREEKS FISH PASSAGE CULVERT REPAIR

APPENDIX I

In-Water Construction Monitoring Report

Beaver-Frazer Creeks Fish Passage Culvert Repair (WHB-02-105)

Start Date: _____
End Date: _____

Waterway: _____ Okanogan County

Construction Activities:

_____
_____
_____
_____
_____

Number of fish observed: _____
Number of salmonid juveniles observed (what kind?): _____
Number of salmonid adults observed (what kind?):

_____

What were fish observed doing prior to construction?_____
_____
_____

What did the fish do during and after construction? _____
_____
_____
_____

Number of fish stranded as a result of this activity: _____

How long were the fish stranded before they were captured and released to flowing water?

_____
_____
_____

Number of fish that were killed during this activity: _____

Send report to:
National Marine Fisheries Service, Washington State Habitat Branch, 510 Desmond Dr. SE, Suite 103, Lacey, WA 98503